

A role for FGF8a in neurovasculature signaling in developing zebrafish

Fibroblast growth factors (FGFs) are critical in many aspects of embryonic development and other cellular functions including apoptosis, cell adhesion, and proliferation. We identified mRNA expression of FGF8a in the retinal ganglion cells (RGCs) and its receptor FGFR1b in surrounding retinal vasculature of 2 day-old zebrafish. Antisense morpholino knockdown of FGF8a resulted in a significant reduction in the number of RGCs and also a reduction in the corresponding tectal innervation. In addition, FGF8a morphant embryos have mispatterned retinal vasculature, suggesting a role in neurovascular signaling. It has previously been reported that zebrafish survive and develop normally for 7 days without blood flow as it receives nutrients by simple diffusion. To rule out hypoxia, we utilized the silent heart mutant, which lacks cardiac troponin t resulting in embryos without blood flow, as heart contractility does not initiate. Cell counts from these fish have however, shown a loss in RGC numbers. Therefore, using immunohistochemistry, we looked to see if loss of RGCs was due to lack of proliferating cells using pHH3 or increased cell death using active caspase 3 in both silent heart and FGF8a mutant fish. We hypothesize that the reduced cell numbers will be due to a lack of proliferating cells and not cell death. To further our understanding of this intricate developmental system we intend to look closer into the connection between the RGCs and the developing vasculature.